Communicating Risks and Mitigations of Tsunami using New Media to Coastal Communities in Pacitan, Indonesia

[1] Jandy Luik, [2]Gatut Priyowidodo
Dept. of Communication – Petra Christian University, Surabaya, Indonesia
E-mail: jandyluik@petra.ac.id

Abstract

National Disaster Management Agency has categorized Pacitan Regency, southern beach of East Java, as one potential area of tsunami. As the potential area, coastal communities in Pacitan should receive information about the risks of tsunami. People in that area should have the knowledge of tsunami mitigation for better disaster preparedness. Therefore, this research is conducted to provide initial information about the knowledge level and communication needs of coastal communities. This research is part of a larger body of effort to provide a proper communication method in disaster literacy. A survey has been conducted to various coastal communities such as fisherman, local seller, farmer, teacher, government officer, and youth. The finding shows people have gained knowledge about tsunami from mass media and socialization from the Agency. However, their level of knowledge remains in the level of what tsunami is. Respondents are saying the need of information about the symptoms and what should they do when tsunami is coming. Respondents also stated the need of interactive-convergence medium to give them broader information about tsunami. As follow-up of this initial finding, researchers would like to provide a new media application to be used as part of disaster literacy.

Keywords: New Media, Disaster Communication, Coastal Communities, Disaster Literacy, Cognitive Response.

Introduction

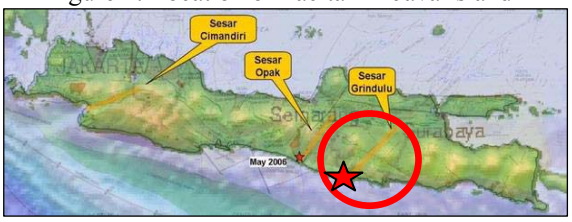
Indonesia has experienced Tsunami in recent years. Tsunami in Banyuwangi (East Java Indonesia on 1994), Tsunami in Papua (2002), and Tsunami in Aceh (2004) are the examples of this disaster. When Tsunami comes, the most vulnerable community is coastal communities in Indonesia [1]. One of the options to deal with disaster is mitigation strategy by communicating disaster risks to vulnerable community [2].

Community Involvement

In 2001, Indonesia has established National Disaster Management Agency to deal with disasters, including tsunami. One of the Agency tasks is to focus on preventive action to the society [3], [4]. Preventive action requires active participation from people in coastal community. To reach the preventive behavior, people need to have improvement in cognitive aspect or knowledge transformation about tsunami.

According to the agency, there are 27 provinces in Indonesia with high potential risk of tsunami [5]. Based on the data, 80% of provinces in Indonesia are potentially attacked by tsunami. Specifically, National Disaster Management Agency has categorized Pacitan Regency, southern beach of East Java, as one potential area of Disaster. As seen in the picture, 'Sesar Grindulu' is located in Pacitan (see the red circle) [6]. Pacitan also categorized as 'high level' in Risk Classes Index [5]

Figure 1: Location of Pacitan in Java Island



Communicating Risks and Mitigation

As follow up from the facts above, a proper communication to coastal community in Pacitan would give adequate knowledge about tsunami. Previous research has shown efforts after the Tsunami happens such as disaster relief and initial response [1], the use of ICT in early warning system [7], media literacy on disaster event [8], and Disaster Risk Reduction [9].

Although there is an early warning system in the vulnerable area, we should not solely depend to the instrument. The further away from the vulnerable humans that the hazard detected by sensing equipment is, the more possible it is to convert the hazard information into an effective warning [7]. To improve the preparedness, the act of disaster literacy would equip the community to face disaster.

Disaster literacy, especially in risk and mitigation, is a best starting point at this moment to involve the society. A research about capacity building for

tsunami early warning system in Indonesia has been conducted [10]. However, there is lack of focus to the communication aspect. Therefore, this paper aims to describe cognitive aspect of coastal community and media of communication.

Cognitive aspect of the communication element such as message, media and communicator may support disaster literacy. Furthermore, disaster communication expectation could be used to measure the communication needs of the respective community.

Method

A survey has been conducted to the coastal community in Pacitan. Respondents have different backgrounds such as fisherman, local seller, farmer, teacher, government officer, and youth. Total of 170 respondents filled the questionnaire.

Measurement

To measure level of knowledge and communication needs, researchers used 26 questions. These questions are categorized as: cognitive aspect of Tsunami (five questions), initial information (three questions), National Disaster Management Agency (four questions), Disaster communication expectations of respondents (six questions), and potential actions of respondents (eight questions).

This paper elaborates the elements: cognitive aspect of Tsunami and disaster communication expectation.

Result and Discussion

Cognitive Aspect

From five-Likert Scale, average of the knowledge score as seen in Table 1 is 3,47. In other words, respondent stated that they have 69% of the ideal knowledge of Tsunami. Cognitive aspect of the community is in the level of moderate to high. This may happen because of the similar preference form respondents to each question. The data shows 31% gap of knowledge about Tsunami.

Table 1: Knowledge about Tsunami

Knowledge about Tsunami	Score
I know about Tsunami	3.74
I know the effect of Tsunami	3.68
I know the symptoms of Tsunami	3.13
I know the risk of living in vulnerable area	3.54
I know the mitigation of Tsunami	3.28
Average	**3.47**

Findings in Table 1 show symptoms and mitigation of Tsunami as the lowest two. "*I know the symptoms of Tsunami*" has the lowest score means the respondent has inadequate knowledge about the symptoms of tsunami. This situation may be problematic because when Tsunami hits coastal area, then there are particular signs about the Tsunami.

Living in a vulnerable area requires awareness of the potential risks that may occurs. Based on the finding, respondents stated *"I know about Tsunami"*. Further question about the effect and risk of living in vulnerable area, then respondents gave lower response. Decreasing of the score (3.74; 3.68; 3.54) indicates inadequate further knowledge about Tsunami.

In cognitive aspect, the findings level of knowledge remains in the level of what tsunami is. Respondents stated the need of information about the symptoms and what should they do when tsunami comes.

Disaster Communication Expectations

Respondents have high expectations in the content and media of disaster communication. As seen in Table 2, almost all of respondents stated the need of Tsunami content. The content would be the symptoms and mitigation. To easier understanding of the issue, respondent also expect interactive media.

Table 2: Disaster Communication Expectation

Disaster Communication Expectation	Yes	No
Knowledge of Tsunami is important	99%	1%
I need communication media about Tsunami	88%	12%
I need old-media	49%	51%
I need interactive media	88%	12%
Disaster literacy is held by the Agency only	63%	37%
Other parties may involve in disaster literacy	61%	39%

Interactive media in this point would be a simulation about the symptoms and mitigation of Tsunami come. Prior knowledge about Tsunami is mostly from mass media and the Agency's presentation. By using computer simulation, the community may receive richer understanding about the symptoms; prepare themselves and how to reduce fatalities when disaster occurs. Simulation gives better understanding because it provide a model of real world situation [11].

Conceptually, the more the audience interacts with multi-sensory media, the more the perspective of the audience. McLuhan stated that television would improve the perspective of human because television requires interplay between eyes and ears

[12]. When new media come with simulation, convergence and interactivity, then what would happen to human sensory and perspective?

On communicator aspect, almost 40% of respondents would like to expand the involvement of other parties in disaster literacy. The finding would suggest involvement of other parties to share responsibilities among the society. Involvement of other parties becomes reasonable in relating to local capacity building [10]. Since the disaster would potentially attack everyone in the area, then the increase of local capacity would be an option. Also, by sharing responsibility would enrich the approach of disaster literacy.

Involvement of other parties such as educational institution [13], non-government organization, local communities, and young people may improve the empowerment of society. Increasing public awareness in education institution and by education institution would be a starting point of involvement. One of the advantages is focusing on sustainable development by providing guidelines and tools [14].

New Media to Communicate Risk and Mitigation of Tsunami

The use of communication technology in disaster communication would give benefits to the preparedness of the people [15]. Preparedness means providing simulation or interactive media about the Tsunami event, symptoms, the potential risks. By giving this, audience or community receives broader information about the Tsunami.

Another side effect of this kind of information is the potential of increase fear of the society. This is a challenge of giving 'bad news' to society. However, in a view of disaster communication, telling facts about potential risks is a must. What should be noted by the communicator is the way of telling facts.

Focusing to the aspect of medium itself, interactive, convergence, and simulation are the three important aspects that should be included in new media application. One of the example of new media application is microworld simulation for increasing awareness [16]

However, creating new media application to communicate risk and mitigation of Tsunami requires not only technical aspects but also the aspect of content. Content in this case is not a shovelware of a brochure, papers, and others information. Content should be managed to reduce redundancy and even more overloaded information. A well-designed content should have narration to let people receive information systematically and in a simple way [17].

Conclusion

Communicating disaster risk and mitigation to vulnerable area such as coastal community in Pacitan, Indonesia is part of disaster risk reduction to the respective community. This paper describes an initial finding of a survey about cognitive aspects and communication needs from the people in the area. Level of knowledge of the community is in the level of what tsunami is. The finding also indicates inadequate further knowledge about Tsunami.

Respondents stated the need of information about the symptoms and what should they do when tsunami occurs. Respondents also stated the need of interactive-convergence medium to give them richer information about tsunami. As follow-up of this initial finding, researchers would like to provide a new media application to be used as part of disaster literacy.

Further analysis of this survey would be expanded to the level of media usage and social aspect of the community to improve the awareness of disaster.

References

[1] V. J. Lee, E. Low, Y. Y. Ng, and C. Teo, "Disaster relief and initial response to the earthquake and tsunami in Meulaboh, Indonesia.," *Annals of the Academy of Medicine, Singapore*, vol. 34, no. 9, pp. 586-90, Oct. 2005.

[2] D. P. Eisenman, K. M. Cordasco, S. Asch, J. F. Golden, and D. Glik, "Disaster planning and risk communication with vulnerable communities: lessons from Hurricane Katrina.," *American journal of public health*, vol. 97 Suppl 1, pp. S109-15, Apr. 2007.

[3] BNPB, "National Disaster Management Plan 2010-2014," Jakarta, 2009.

[4] BNPB, "Tupoksi - Badan Nasional Penanggulangan Bencana," 2012. [Online]. Available: http://www.bnpb.go.id/website/asp/content.asp?id=27.

[5] L. Kurniawan, Y. Kurniawan, M. R. Amri, and N. Pramudiarta, *INDEKS RAWAN BENCANA INDONESIA*. Jakarta: Badan Nasional Penanggulangan Bencana, 2011.

[6] H. Surahman, “Pacitan Paling Rawan Gempa Tektonik,” *Kompas.Com*, 2012.

[7] R. Samarajiva, “Mobilizing information and communications technologies for effective disaster warning: lessons from the 2004 tsunami,” *New Media & Society*, vol. 7, no. 6, pp. 731-747, Dec. 2005.

[8] W. M. Adiputra, “Literasi Media dan Interpretasi atas Bencana.pdf,” *Jurnal Ilmu Sosial dan Ilmu Politik*, vol. 11, no. 3, pp. 287-414, 2008.

[9] E. U. Concern, “Approaches to Disaster Risk Reduction,” no. September. 2005.

[10] H. Spahn, M. Hoppe, H. D. Vidiarina, and B. Usdianto, “Experience from three years of local capacity development for tsunami early warning in Indonesia: challenges, lessons and the way ahead,” *Natural Hazards and Earth System Science*, vol. 10, no. 7, pp. 1411-1429, Jul. 2010.

[11] M. Lister, J. Dovey, S. Giddings, K. Kelly, and I. Grant, *New Media : a critical introduction*, Second Edi. New York,: Routledge, 2009.

[12] M. Mcluhan, *Understanding Media: The extensions of man*, First Edit. London, New York: McGraw Hill, 1964.

[13] S. Ito, “Public Awareness of Disaster Risks through Education,” no. August. Regional Workshop on Total Disaster Risk Management, Japan, 2002.

[14] L. Gregario, *Scientific Literacy and Natural Disaster Preparedness*. Bangkok: UNESCO, 2010.

[15] S. Yodmani and D. Hollister, “Disasters and Communication Technology : Perspectives from Asia,” in *Second Tampere Conference on Disaster Communications*, 2001, no. May, pp. 28-30.

[16] J. E. Luik, “New media bagi Keberlanjutan : Microworld simulation sebagai sebuah alternatif dalam mensinergikan kesadaran lingkungan ke dalam kehidupan sehari-hari.,” in *Konferensi Nasional Lingkungan Hidup*, 2011.

[17] J. E. Luik, “Media dan Perubahan Iklim: Aplikasi Medium Komunikasi Terkini dalam Mengkomunikasikan Mitigasi dan Adaptasi Perubahan Iklim.,” in *Konferensi Nasional Lingkungan Hidup*, 2009.